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Mobile technology for health care in rural China

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ABSTRACT

With the proliferation of mobile technologies in China, the Chinese mobile medical applications market is growing rapidly. This may be particularly useful for Chinese rural populations who have limited access to quality medical care where mobile technologies can reach across geographic and socioeconomic boundaries and potentially increase access to care and improve health outcomes.

1. Introduction

China has the largest population in the world and is home to more than 1.3 billion people. According to the World Bank [1], the rural population in China is 651,364,560 and constitutes half of China's population. However, in China medical institutions are concentrated in cities. In fact, over 80% of the medical institutions are concentrated in cities [2] and high-qualified health care providers overwhelmingly reside in urban areas. In addition, Chinese health insurance has traditionally been employer-based which favors urban residents that are employed. Although the Chinese government has extended medical insurance to rural residents for the past decade, the insurance coverage is much more limited than urban residents. Thus, seeing a health care provider is a time consuming process for people living in rural areas. To reach a health care provider many people from rural areas must take a bus for hours to urban areas to find qualified providers. This need to travel to an urban area limits rural residents' access to quality medical care and may impact health outcomes across the lifespan. One proposed solution is to use mobile technologies, known as mobile health, as tools to increase access to care and care delivery for those living in rural China.

Mobile health (mHealth) is defined as the use of portable electronic devices with software applications, known as "apps", to provide health services and manage patient information. Telemonitoring is one of the greatest functions of mHealth. It "entails the use of an electronic device to generate remote, real-time monitoring of medical conditions, facilitate disease management, and provide patient education." [3] In addition, mHealth plays an important role in chronic disease management. Many chronic diseases need frequent monitoring and care over a long period of time. In China, portable health monitoring devices that continuously and accurately report physical activity and other wide-ranging biomarkers including temperature, blood pressure, heart rate, electrocardiogram, weight and glucose are necessary tools for

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clinicians and researchers to overcome physical boundaries between patients and clinicians.

With more than 1 billion mobile connections [4] and 500 million mobile Internet users [5], China is experiencing an outburst of mobile activities beyond phone calls: texting, tweeting, blogging, watching videos, listening to audio, banking, reading, gaming, shopping, emailing, enjoying location-based services, and social networking are common activities. Information from the China Internet Network Information Center in 2013 reported that 78.9% of people in rural China who use the Internet relied on mobile phones to do so. The rapid growth in the use of mobile phones has opened a new world of opportunities for accessing people in rural areas to improve health and care delivery.

mHealth technologies have the potential to conveniently provide clinicians and researchers with persistent and unbiased patient data that can be used to monitor recovery, identify patients most in need of intervention, and modify treatment course [3]. For example, this technology could greatly assist disabled patients or patients recovering from surgery who live far away from hospitals by allowing clinicians to monitor them from afar. This may improve access to quality care, and prevent frequent and costly trips to an urban health care facility.

The Chinese mobile medical applications market is growing rapidly. Groupe Speciale Mobile Association (GSMA) estimates that in 2017 the countries with the largest mHealth markets will be the United States and China [6]. Furthermore, remote monitoring devices will represent a fast-growing part of the mHealth sector. According to a report jointly authored by GSMA and PricewaterhouseCoopers (PwC), the Chinese medical monitoring services market will reach $1.2 billion by 2017, with over 90% of the revenues coming from chronic disease management solutions. [6]

In September 2011, China launched the Wireless Heart Health project for the prevention and care of cardiovascular diseases (CVDs) in underserved communities. This mHealth program is designed to support rural communities that don't have access to the same care found in big cities. The program involved distributing a 3G system including smartphones with built-in ECG sensors, web-based EMR software, and Internet-ready workstations to community health clinics in rural areas. Clinics used these tools to perform cardiovascular screenings on more than 10,000 patients, 1700 of whom were referred to higher-level clinics for treatment. This project aims to explore a new health care solution to enhance the CVD diagnosis and prevention capabilities of community health clinics in China.

2. Challenges

Nevertheless, there are a number of challenges for mHealth to overcome if it is going to improve health care in rural populations in China [7]. First, although there are many mobile health applications, currently the user utilization rate is still low in China. mHealth is in its fledgling state, and so in the overall health care infrastructure it's playing a very small role. iMedia Consulting data shows that only 2.9% of Chinese mobile phones have an installed mobile health application [6]. Second, there are policy and legal challenges in China. "Currently the Chinese Ministry of Health only allows mobile health service providers to offer consulting services through mobile devices" [6]. Treating patients or offering prescriptions are not authorized. The limited opportunity to provide patient care has slowed the development of mHealth and represents a major obstacle for growth. Third, chronic diseases are more common in older adults. However, so far, the vast majority of smart phone users are younger populations. Limited users are older adults, particularly in rural areas. Fourth, there remains uncertainty about regulation and standards. The lack of standards makes it more difficult for companies to develop new products and services.

3. The future of mHealth in China

With the proliferation of mobile technologies in China, the Chinese mobile medical applications market is growing rapidly. This may be particularly useful for Chinese rural populations who have limited access to quality medical care where mobile technologies can reach across geographic and socioeconomic boundaries and potentially increase access to care and improve health outcomes.

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